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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/665,208

09/18/2000

Chang-seok Kang

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4274

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7590

06/12/2006

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EXAMINER

MOORE, KARLA A

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 06/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/665,208

Applicant(s)

KANG ET AL.

Examiner

Karla Moore

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 24,25,27,29-35,45-50,55 and 58 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 24,25,27,29-35,45-50,55 and 58 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 September 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 27, 29, 35, 55 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,989,999 to Levine et al. in view of U.S. Patent No. 5,501,739 to Yamada et al.

3. Levine et al. disclose an apparatus for forming a thin film on a substrate substantially as claimed, the apparatus comprising: a multifunctional chamber (Figure 5, 112) configured to deposit a dielectric layer on a substrate, wherein the multifunctional chamber comprises: a support plate (116) configured to hold the substrate; a heater unit (130) positioned under the support plate; a source dispersion device (136) positioned above the support plate and configured to uniformly disperse organic source liquid; a source supplier (bubbler, not illustrated; column 16, row 63 through column 17, row 6) in fluid communication with the source dispersion device; and an oxygen radical or plasma annealing unit (142; column 9, rows 3-7) connected to the multifunctional chamber and configured to provide oxygen radical or plasma gas to the multifunctional chamber to oxygen radical or plasma anneal one or more electrode and/or dielectric layers on the substrate in the multifunctional chambers, said oxygen radical or plasma annealing unit comprising a gas source selected from the group consisting of O₂, NH₃, Ar, N₂ and N₂O (column 16, rows 52-55).

4. However, Levine et al. fail to explicitly teach each of the structures need for deposition of the organic source liquid.

5. Yamada et al. disclose an organic source liquid deposition apparatus and method comprising: a liquid mass flow controller (118) configured to control a flow of organic source liquid; an evaporator (column 7, rows 5-28) in fluid communication with the flow controller and configured to evaporate the

Art Unit: 1763

source liquid; and a transfer gas source (column 4, rows 54-59) in fluid communication with the evaporator and configured to transfer an organic source from the evaporator to the source dispersion device for the purpose of forming a film which can prevent generation of dust on the surface of a film after the film is formed on a substrate and the deterioration of the properties of the film is prevented so that the desired thin film is obtained and yield is improved (column 1, rows 6-10 and column 2, rows 14-26).

6. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided each of liquid mass flow controller, an evaporator, and a transfer gas in Levine et al. in order to form a film where generation of dust on the surface of a film after the film is formed on a substrate is prevented and the deterioration of the properties of the film is also prevented so that the desired thin film is obtained and yield is improved as taught by Yamada et al.

7. With respect to claim 35, Yamada et al. teach the use of a pre-heating chamber (column 3, rows 20-22) for the purpose of heating a substrate to a pre-determined temperature and a cooling chamber (column 3, rows 39-44) for the purpose of cooling a substrate.

8. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a cooling chamber and a pre-heating chamber connected to the transfer chamber in Figure 8 of Yamada et al. in order to heat a substrate to a desired temperature before processing and cool a substrate to a desired temperature after processing without subjecting the substrate to the outside atmosphere (column 10, rows 9-33) as taught by Yamada et al.

9. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Levine et al. and Yamada et al. as applied to claims 27, 29, 35, 55 and 58 above, and further in view of U.S. Patent No. 5,217,559 to Moleshi et al.

10. Levine et al. and Yamada et al. disclose the invention substantially as claimed and as described above.

11. However, Levine et al. and Yamada et al. fail to teach the oxygen radical or plasma annealing unit is an ozone generator/plasma generator.

Art Unit: 1763

12. Moleshi et al. teach the use of an ozone generator/plasma generator for the purpose of generating a plasma species for substrate processing (column 4, rows 19-25).

13. It would have been obvious to one of ordinary skill in the art to have provided a plasma generator in Levine et al. and Yamada et al. in order to generate a plasma species for processing a substrate as taught by Moleshi et al.

14. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Levine et al. and Yamada et al. as applied to claims 27, 29, 35, 55 and 58 above, and further in view of U.S. Patent No. 4,578,880 to Montev et al.

15. Levine et al. and Yamada et al. disclose the invention substantially as claimed and as described above.

16. However, Levine et al. and Yamada et al. fail to teach that the multi-functional chamber further comprises an ozone remover connected to an exhaust end.

17. Montev et al. teach providing an ozone remover for the purpose of preventing ozone from accumulating in a work area (column 8, rows 22-30).

18. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an ozone remover in Levine et al. and Yamada et al. in order to prevent ozone accumulation as taught by Montev et al.

19. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Levine et al. and Yamada et al. as applied to claims 27, 29, 35, 55 and 58 above, and further in view of U.S. Patent 4,786,352 to Benzing.

20. Levine et al. and Yamada et al. disclose the invention substantially as claimed and as described above.

21. However, Levine et al. and Yamada et al. fail to teach a cleaning gas supplier in fluid communication with the multi-functional chamber.

Art Unit: 1763

22. Benzing teaches the use of a cleaning gas supply (column 2, rows 2-8 and column 12, rows 41-46) for the purpose of cleaning any tooling (i.e. walls of the chamber) or surfaces of substrates.

23. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a cleaning gas supply Levine et al. and Yamada et al. in order to clean any tooling of the surfaces of substrates as taught by Benzing.

25. Claims 31 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over to Levine et al. and Yamada et al. as applied to claims 27, 29, 35, 55 and 58 above, and further in view of U.S. Patent No. 6,040,585 to Hsiao.

26. However, Levine et al. and Yamada et al. fail to disclose the apparatus comprising a loadlock chamber configured to introduce the substrate into the apparatus; and a transfer chamber connected to the loadlock chamber and configured to transfer the substrate between processing chambers, wherein the multifunctional chamber is connected to the transfer chamber.

27. Hsiao teaches providing a multi-chamber apparatus comprising a plurality of processing chamber surrounding a transfer chamber and a load lock chamber for introducing a substrate into the multi-chamber apparatus for the purpose of providing an apparatus capable of generally effective and efficient treatment of a substrate.

28. It would have been obvious to have provided a multi-chamber apparatus comprising a comprising a loadlock chamber configured to introduce the substrate into the apparatus; and a transfer chamber connected to the loadlock chamber and configured to transfer the substrate between processing chambers, wherein a plurality of processing chambers are connected to the transfer chamber in Levine et al. and Yamada et al. in order to provide a generally effective and efficient processing apparatus as taught by Hsaio

29. With respect to claim 34, Levine et al. disclose a multi-chamber apparatus comprising a first oxygen radical or plasma annealing chamber. The mere duplication of parts has no patentable significance unless a new and unexpected result is produced. In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960).

30. Claims 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Levine et al. and Yamada et al. and Hsiao as applied to claims 31 and 34 above, and further in view of U.S. Patent No. 5,804,471 to Yamazaki et al.

31. Levine et al. and Yamada et al. and Hsiao disclose the invention substantially as claimed and as described above.

32. However, Levine et al. and Yamada et al. and Hsiao fail to explicitly teach constructing a multichamber apparatus with various chamber for both deposition (e.g. electrode deposition) and post-deposition processes (e.g. crystallization anneal).

33. Yamazaki et al. teach the use of a multichamber system for providing a high degree of cleanliness in fabricating semiconductor devices and improved productivity by providing various vacuum apparatus (abstract and column 1, rows 30- column 2, rows 16).

34. It would have been obvious to one of ordinary skill in the art at the time the Applicants invention was made to have provided a multichamber apparatus comprising various deposition and post deposition vacuum chambers in Levine et al. and Yamada et al. Hsiao in order to provide a high degree of cleanliness and improved productivity as taught by Yamazaki et al.

35. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,989,999 in view of U.S. Patent No. 5,501,739 to Yamada et al. in view of U.S. Patent No. 6,096,597 and U.S. Patent 4,786,352 to Benzing.

36. Levine et al. disclose an apparatus for forming a thin film on a substrate substantially as claimed comprising: a multifunctional chamber (Figure 5, 112) configured to deposit a dielectric layer on a substrate, wherein the multifunctional chamber comprises: a support plate (116) configured to hold the substrate; a heater unit (130) positioned under the support plate; a source dispersion device (136) positioned above the support plate and configured to uniformly disperse organic source liquid; a source supplier (bubbler, not illustrated; column 16, row 63 through column 17, row 6) in fluid communication with the source dispersion device; and an oxygen radical or plasma annealing unit (142; column 9, rows

Art Unit: 1763

3-7) connected to the multifunctional chamber and configured to provide oxygen radical or plasma gas to the multifunctional chamber to oxygen radical or plasma anneal one or more electrode and/or dielectric layers on the substrate in the multifunctional chambers, said oxygen radical or plasma annealing unit comprising a gas source selected from the group consisting of O₂, NH₃, Ar, N₂ and N₂O (column 16, rows 52-55).

37. However, Levine et al. fail to explicitly teach each of the structures need for deposition of the organic source liquid.

38. Yamada et al. disclose an organic source liquid deposition apparatus and method comprising: a liquid mass flow controller (118) configured to control a flow of organic source liquid; an evaporator (column 7, rows 5-28) in fluid communication with the flow controller and configured to evaporate the source liquid; and a transfer gas source (column 4, rows 54-59) in fluid communication with the evaporator and configured to transfer an organic source from the evaporator to the source dispersion device for the purpose of forming a film which can prevent generation of dust on the surface of a film after the film is formed on a substrate and the deterioration of the properties of the film is prevented so that the desired thin film is obtained and yield is improved (column 1, rows 6-10 and column 2, rows 14-26).

39. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided each of liquid mass flow controller, an evaporator, and a transfer gas in Levine et al. in order to form a film where generation of dust on the surface of a film after the film is formed on a substrate is prevented and the deterioration of the properties of the film is also prevented so that the desired thin film is obtained and yield is improved as taught by Yamada et al.

40. Levine et al. and Yamada et al. disclose the invention substantially as claimed and as described above.

41. However, the Levine et al. and Yamada et al. fail to teach a cleaning gas supplier in fluid communication with the multi-functional chamber.

42. Benzing teaches the use of a cleaning gas supply (column 2, rows 2-8 and column 12, rows 41-46) for the purpose of cleaning any tooling (i.e. walls of the chamber) or surfaces of substrates.

Art Unit: 1763

43. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a cleaning gas supply in Levine et al. and Yamada et al. in order to clean any tooling of the surfaces of substrates as taught by Benzing.

44. Claims 46, 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Levine et al., Yamada et al. and Benzing as applied to claim 45 above, and further in view of U.S. Patent No. 6,040,585 to Hsiao.

45. Levine et al., Yamada et al. and Benzing disclose the invention substantially as claimed and as described above.

46. However, Levine et al., Yamada et al. and Benzing fail to disclose the apparatus comprising a loadlock chamber configured to introduce the substrate into the apparatus; and a transfer chamber connected to the loadlock chamber and configured to transfer the substrate between processing chambers, wherein the multifunctional chamber is connected to the transfer chamber.

47. Hsiao teaches providing a multi-chamber apparatus comprising a plurality of processing chamber surrounding a transfer chamber and a load lock chamber for introducing a substrate into the multi-chamber apparatus for the purpose of providing an apparatus capable of generally effective and efficient treatment of a substrate.

48. It would have been obvious to have provided a multi-chamber apparatus comprising a comprising a loadlock chamber configured to introduce the substrate into the apparatus; and a transfer chamber connected to the loadlock chamber and configured to transfer the substrate between processing chambers, wherein a plurality of processing chambers are connected to the transfer chamber in Levine et al., Yamada et al. and Benzing in order to provide a generally effective and efficient processing apparatus as taught by Hsaio

49. With respect to claim 49, Levine et al. discloses a multichamber apparatus comprising a first oxygen radical or plasma annealing chamber. The mere duplication of parts has no patentable significance unless a new and unexpected result is produced. In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960).

Art Unit: 1763

50. With respect to claim 50, Yamada et al. teach the use of a pre-heating chamber (column 3, rows 20-22) for the purpose of heating a substrate to a pre-determined temperature and a cooling chamber (column 3, rows 39-44) for the purpose of cooling a substrate.

51. Claims 47 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Levine et al., Yamada et al., Benzing and Hsiao as applied to claims 46, 49 and 50 above, and further in view of U.S. Patent No. 5,804,471 to Yamazaki et al.

52. Levine et al., Yamada et al., Benzing and Hsiao disclose the invention substantially as claimed and as described above.

53. However, Levine et al., Yamada et al., Benzing and Hsiao fail to teach explicitly teach constructing a multichamber apparatus with various chambers for both deposition (e.g. electrode deposition) and post-deposition processes (e.g. crystallization anneal).

54. Yamazaki et al. teach the use of a multichamber system for providing a high degree of cleanliness in fabricating semiconductor devices and improved productivity by providing various vacuum apparatus (abstract and column 1, rows 30- column 2, rows 16).

55. It would have been obvious to one of ordinary skill in the art at the time the Applicants invention was made to have provided a multi-chamber apparatus comprising various deposition and post deposition vacuum chambers in Levine et al., Yamada et al., Benzing and Hsiao in order to provide a high degree of cleanliness and improved productivity as taught by Yamazaki et al.

Response to Arguments

56. Applicant's arguments filed 29 March 2006 have been fully considered but they are not persuasive.

57. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of

Art Unit: 1763

ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, as noted above Yamada discloses an apparatus and method for successfully forming a film on a semiconductor device, as detailed above. This is reason for combination with the disclosure of Levine who is also concerned with successfully forming a thin film.

58. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Conclusion

59. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Art Unit: 1763

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 571.272.1440. The examiner can normally be reached on Monday-Friday, 9:00 am-6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571.272.1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Karla Moore
Primary Examiner
Art Unit 1763
8 June 2006